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REMARKS

In the *Office Action* of April 17, 2008, Claims 4-11 and 21-25 were finally rejected as obvious over the references of record. In particular, the Examiner noted:

Claims 4-11 and 21-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 2001/90042, as evidenced by counterpart U.S. Patent No. 6,790,983 to Zeyss et al., of record (Zeyss) in view of *Kirk-Othmer Encyclopedia of Chemical Technology* Copyright © 2002 Article Online Posting Date: July 19, 20002 pp. 115-136, of record, (Kirk Othmer), or Wansborough, MUTECH Chemical Engineering Journal (1965), No. 11, 61-7 (Wansborough).

Zeyss teaches an integrated process for the production of vinyl acetate which comprises the steps:

- (a) contacting in a first reaction zone a gaseous feedstock comprising essentially ethane with a molecular oxygen-containing gas in the presence of a catalyst to produce a first product stream comprising acetic acid and ethylene;
- (b) contacting in a second reaction zone the first gaseous product stream with a molecular-oxygen-containing gas in the presence of a catalyst to produce a second product stream comprising vinyl acetate;
- (c) separating the product stream from step (b) and recovering vinyl acetate from said product stream from step (b). See column 2 lines 15-27.

The claims also teach the use of a stem condensate line, which is not explicitly taught by Zeyss.

Kirk Othmer teaches a carbonylation process for preparing acetic acid, including a steam condensate and flash distillation

Moreover, Wansborough teaches that stem condensate lines are routine in heat transfer systems, see attached CAS online citation, 65:79898 [retrieved 17 august 2007] from STN, Columbus, OH, USA.

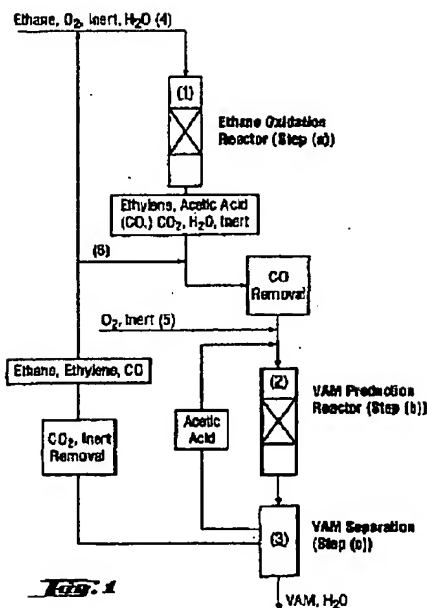
Therefore the use of steam condensate lines would have been obvious for the purpose of heat transfer since Kirk Othmer and Wansborough teach that these are common and predictable means for heat transfer, which would be appropriate for the integrated process on Zeyss. Therefore, the rejected claims are *prima facie* obvious in view of the combination of Zeyss and Kirk Othmer or Wansborough since the combination of these references teaches or suggest the elements of the rejected claims.

Claim 4 has been amended to correct an obvious typographical error; entry after final action is respectfully requested since this correction will put this case in better condition for issuance or appeal. Reconsideration of the rejections is also requested inasmuch as none of the references teach the elements of the claimed subject matter. In this regard, the Examiner has apparently misapprehended the *Kirk-Othmer* and *Wansborough* references, as is discussed in more detail below after first summarizing the claimed subject matter.

The present invention relates generally to integrated processes and systems for producing acetic acid and vinyl acetate wherein a portion of the heat produced during the production of acetic acid by exothermic carbonylation is transferred to the vinyl acetate production and/or purification process to facilitate production and/or purification of the vinyl acetate. The system comprises: a first reaction zone for the production of acetic acid; a second section zone for the production of vinyl acetate, wherein at least a portion of the acetic acid produced in the first reaction zone is fed to the second reaction zone; a purification section for purifying at least a portion of the vinyl acetate produced in the second reaction zone; a heating transfer system for transferring heat produced in the first reaction zone to either the acetic acid being fed to the second reaction zone or to the purification section, wherein the heat transfer includes the use of a steam condensate stream. In the claimed embodiments of the invention the acetic acid is produced in the first reaction zone by an exothermic carbonylation reaction. This is a more energy efficient process than any of the references since heat is generated and consumed in the processes as required, providing synergy in a hybrid processing scheme.

Zeyss et al. discloses a two stage industrial process for the production vinyl acetate; however, acetic acid is not produced by exothermic carbonylation in that reference:

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Rather, the acid is produced by ethane oxidation which is probably not exothermic to any substantial degree; thus, no heat is available. Moreover, Zeyss *et al.* is devoid of any teaching(s) or suggestion(s) of heat transfer between the first stage and the second stage of the process.

Kirk-Othmer is the entry for "acetic acid" in the Kirk-Othmer Encyclopedia of Chemical Technology. Of this reference, only pages 123-125 are at all pertinent to the present invention. Pages 123-125 describe methanol carbonylation in general; however, this reference is also devoid of any teaching or suggestion of using the heat of reaction of methanol carbonylation to facilitate vinyl acetate production as is claimed in this case. Furthermore, an inspection of the diagram on page 124 fails to provide any evidence that heat of reaction is being recovered and used:

It is readily apparent from the diagram that each condenser or heat exchanger has unspecified heat inputs and outputs. Application of this reference to the claimed subject matter is merely hindsight.

Wansborough (Approaches to process control problems) is directed to control schemes for industrial chemical processes, particularly steam heated, tube-in-shell heat exchangers. Here again, the reference is devoid of any teaching or suggestion of using the heat of reaction of methanol carbonylation to facilitate vinyl acetate production as is claimed in this case. *Note*, for example, the **Figure** on the second page of the article:

Heat Exchanger Control

The basic control scheme outlined above, when applied to a steam-heated, tube-in-shell exchanger, has the form shown in Fig. 2.

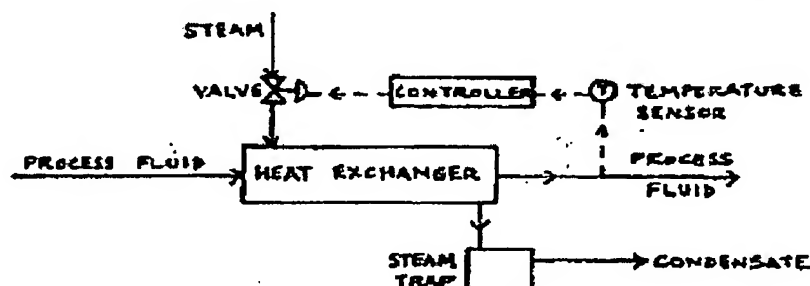


FIG 2 : BASIC HEAT EXCHANGER CONTROL SYSTEM

It is readily apparent from the diagram that *Wansborough* is actually adding heat to the process fluid, rather than removing it and using it for subsequent processing as claimed in this application. Here again, the reference fails to add disclosure pertinent to the claimed subject matter.

Claim 4 and the other claims are allowable because they require heat transfer from the carbonylation process to the vinyl acetate production process. *Zeyss et al.* does not disclose, teach or suggest carbonylation or heat transfer to make the process more efficient. *Kirk-Othmer* and *Wansborough* are devoid any teaching or fair suggestion to transfer heat of reaction to another integrated process. Accordingly, the prior art is insufficient to support a rejection. It is incumbent on the Patent Office to establish at least *prima facie* that particular claims are not patentable if it wishes to reject them; otherwise the claims must be allowed.

Claim 5 recites that "the steam condensate stream is directed to a flash vessel maintained at a temperature of about 150°C to about 160°C". Claim 6 recites "wherein the flash vessel is maintained at a pressure of about 4.0 kg/cm. to about 5.3 kg/cm". The references are devoid of any disclosure or suggestion of these limitations.

Claims 7-11 recite, respectively, "The process of Claim 4 wherein the heat removed

from the production of acetic acid is transferred from the steam condensate of the heat transfer system to : 1. a vinyl acetate azeotrope column feed steam in the purification section for purifying vinyl acetate [Claim 7]; 2. a reboil stream of light ends column in the purification section for purifying vinyl acetate [Claim 8]; 3. a reboil stream used in conjunction with a finishing column in the purification section for purifying vinyl acetate [Claim 9]; 4. the acetic acid reaction stream [Claim 10]; 5. a reboil stream of a light ends column in the purification section for purifying vinyl acetate and to reboil stream used in conjunction with a finishing column in the purification section for purifying vinyl acetate [Claim 11].” Again the references are completely devoid of and teaching or suggestion of these particulars.

Claim 23 recites, “(a) ... wherein at least a portion of the heat from the production of acetic acid is removed from the first reaction zone and at least a portion of the heat removed from the production of acetic acid is transferred into a heat transfer system; ... (d) removing at least a portion of the heat transferred to the heat transfer system and providing at least a portion of the heat removed from the heat transfer system to at least one of the acetic acid reaction and the purification section for purifying vinyl acetate, wherein the heat transfer system comprising a pump-around condensate loop in which the heat from the production of the acetic acid is removed from the first reaction zone through heat exchange between a hot reaction solution stream and a steam condensate stream.”. The three references fail to explicitly teach or fairly suggest the above features, particularly the “pump-around steam condensate loop”.

Dependent Claims 22 and 23 recite the same limitations as Claims 5 and 6. See Applicant’s remarks concerning Claims 5 and 6, above.

It is respectfully submitted that the rejections in this case are merely hindsight-based and should be withdrawn. The references, especially *Zeyss et al.* and *Kirk Othmer*, are fundamentally different as noted above, making that proposed combination improper. In this regard, Applicant notes *Ex parte Willems*, 84 USPQ2d 1350, 1352 (CAFC 2006) which notes that unlike disclosures should not be combined:

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Given the disparate structures and functions of Koll's handle assembly and Willems' latch, Willems would not appear to provide any suggestion to modify the Koll handle assembly to provide a base plate to which the bracket plate is mounted and to provide raised or projecting parts, such as projecting parts 127, 128 of Willems, on such base plate to keep objects away from Koll's handle, as the examiner contends on page 4 and 5 of the answer. From our perspective, the only suggestion for modifying Koll's handle assembly in this manner is found in the luxury of hindsight accorded one who first viewed appellant's disclosure. This, of course, is not a proper basis for a rejection. *See In re Fritch*, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992).

Likewise, there is no motivation provided whatsoever to combine *Wansborough* and *Zeyss et al.*, making that combination improper (and incomplete in any event since carbonylation is recited in all of the independent claims). *See In re Fritch*, 23 USPQ2d 1780, 1783-4 (CAFC 1992) which is likewise *apropos*:

Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. Under section 103, teachings of references can be combined *only* if there is some suggestion or incentive to do so." Although couched in terms of combining teachings found in prior art, the same inquiry must be carried out in the context of a purported obvious "modification" of the prior art. The mere fact that the prior art may be *modified* in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification. Wilson and Hendrix fail to suggest any motivation for, or desirability of, the changes espoused by the Examiner and endorsed by the Board.

Here, the Examiner relied upon hindsight to arrive at the determination of obviousness. It is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious. This court has previously stated that "[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.

The prohibition against using hindsight is further seen in *KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385, 1397 (U.S. Sup. Ct. 2007):

A factfinder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning. See *Graham*, 383 U.S., at 36 (warning against a "temptation to read into the prior art the teachings of the invention in issue" and instructing courts to "guard against slipping into the use of hindsight" (quoting *Monroe Auto Equipment Co. v. Heckethorn Mfg. & Supply Co.*, 332 F.2d 406, 412 [141 USPQ 549] (CA6 1964))).

as well as the obviousness guidelines published by the Office on October 10, 2007, Federal Register Vol. 72 No. 195, page 57529, item G:

...G. Some Teaching, Suggestion, or Motivation in the Prior Art That Would Have Led One of Ordinary Skill to Modify the Prior Art Reference or To Combine Prior Art Reference Teachings To Arrive at the Claimed Invention

To reject a claim based on this rationale, Office personnel must resolve the *Graham* factual inquiries. Office personnel must then articulate the following:

(1) a finding that there was some teaching, suggestion, or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings; ...

Here, there is no relevant teaching in the prior art as to combining or modifying the references and the obviousness rejections should be reversed for this reason.

Finally, it is noted that the present invention provides a means by which to conserve energy and reduce operating costs. Improvements in efficiency are patentable. *Note In re Wright*, 122 USPQ 522, 524 (CCPA 1959):

Though the court may have believed that each of the elements in the patented device was old, it does not follow that the combination was unpatentable. We need not elaborate upon the rule that a novel combination of old elements which so cooperate with each other so as to produce a new and useful result or a substantial increase in efficiency, is patentable. See *Lewyt Corp. v. Health-Mor, Inc.*, 7 Cir., 181 F.2d 855, 85 USPQ 335, certiorari denied 340 U.S. 823, 71 S.Ct. 57, 95 L.Ed. 605, 87 USPQ 432; *Blaw-Knox Co. v. Lain Co.*, 7 Cir., 230

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F.2d 373, 108 USPQ 356 . *Weller Manufacturing Company v. Wen Products, Inc.*,
7 Cir., 231 F.2d 795, 798, 109 USPQ 73, 75 (1956).

In view of the above amendments and Remarks, this application is believed in condition
for allowance. If for any reason the Examiner would like to discuss this case, the Examiner is
invited to call at the number listed below.

Respectfully submitted,



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